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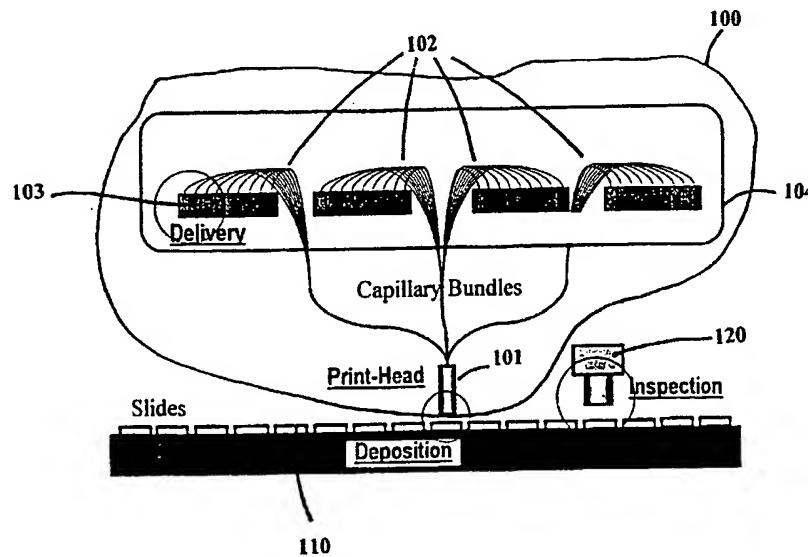
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[Continued on next page]

(54) Title: MICROARRAY FABRICATION TECHNIQUES AND APPARATUS



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(57) Abstract: Disclosed is a microarray printing system (100) and methods of printing probe microarrays (1101). The system has a print head (101, 200, 805, 1003, 1700, 1800, 1900) formed of one or more bundles (201-221, 604) of individual capillaries, (102, 301, 402a, 402b, 502a, 502b, 603a, 603b, 802) such as light-guiding capillaries. The bundles may especially be random bundles of capillaries that provide a large number of probes (807, 1006a, 1006b, 1206) on the surface of a substrate. Methods of registering or correlating the distal and proximal ends of the capillaries are also provided. Further, the invention provides methods and equipment for identifying defective microarrays that are missing one or more probes from the surface of the microarray.



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## INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER  
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According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
 IPC 7 B01L B01J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, INSPEC, COMPENDEX

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	MARK SCHENA ET AL.: "Microarrays: biotechnology's discovery platform for functional genomics" TIBTECH, vol. 16, no. 7, 1 July 1998 (1998-07-01), pages 301-306, XP004145643 CAMBRIDGE, UK ISSN: 0167-7799 the whole document ----	1-19
X	MICHAEL B. EISEN ET AL.: "12 DNA ARRAYS FOR ANALYSIS OF GENE EXPRESSION" METHODS IN ENZYMOLOGY, vol. 303, 1999, pages 179-205, XP000995864 SAN DIEGO, CA, USA ISSN: 0076-6879 page 188, paragraph 2 -page 189, paragraph 1 ----	1-6, 10, 14, 15
		-/-

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X	MARK SCHENA : "GENOME ANALYSIS WITH GENE EXPRESSION MICROARRAYS" BIOESSAYS, vol. 18, no. 5, 1996, pages 427-431, XP002916033 CAMBRIDGE, UK ISSN: 0265-9247 page 427, right-hand column, last paragraph -page 428, left-hand column, paragraph 2 ---	1-5, 10, 13-16
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		-/-

## INTERNATIONAL SEARCH REPORT

International Application No

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
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X	US 5 807 522 A (PATRICK O. BROWN & TIDHAR DARI SHALON) 15 September 1998 (1998-09-15) cited in the application column 4, line 16 - line 23 column 6, line 32 - line 38 column 9, line 30 - line 45 column 15, line 19 - line 43 ---	1-5,10, 11,13-19
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A	WO 00 01859 A (ORCHID BIOCOMPUTER, INC.) 13 January 2000 (2000-01-13) cited in the application the whole document ---	23-36, 42-88, 90-94, 97-109, 111-158
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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 98 29736 A (GENOMETRIX INCORPORATED) 9 July 1998 (1998-07-09) cited in the application  page 22, line 11 -page 24, line 17 page 27, line 6 -page 28, line 15 page 42, line 20 -page 43, line 8 figures 4,4A,4B ---	1-5,10, 11, 13-16, 23-28, 37,38, 42,43, 46-50, 53-56, 110
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FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.2

Claims Nos.: 1-22, 37-41, 89, 95, 06, 110, 159-211; 23-36, 42-88, 90-94, 97-109, 111-158 (IN PART)

- In view of the large number and also the wording of the claims presently on file, it is difficult, if not impossible, to determine the exact subject matter for which protection is sought.

The initial phase of the search revealed a very large number of documents relevant to the issue of novelty for the subject matter of microarrays comprising at least 500 different probes per cm<sup>2</sup>. So many documents were retrieved that it is impossible to determine which parts of the claims may be said to define subject-matter for which protection might legitimately be sought (Article 6 PCT). For these reasons, a meaningful search over the whole breadth of the claims is impossible.

Moreover, present claims 1-211 relate to an extremely large number of possible arrays, methods of forming arrays, devices for forming the arrays, methods of fabricating the devices for making the arrays, methods of using the arrays and light and fluid conducting capillaries. In fact, the claims contain so many options, variables, and possible permutations that a lack of clarity and/or conciseness within the meaning of Article 6 PCT arises to such an extent as to render a meaningful search of the claims impossible.

The present therefore application fails to comply with the clarity and conciseness requirements of Article 6 PCT (see also Rule 6.1(a) PCT) to such an extent that a meaningful search is impossible. Consequently, the search has been carried out for those parts of the application which do appear to be clear and concise, namely

I: A print system and a method for forming microarrays, which system comprises a print head formed from a bundle of light conducting, hollow capillaries, the capillaries being in fluid communication at their distal ends with a plurality of reservoirs, and their proximal ends being adapted for depositing fluids on a support surface, wherein the proximal and distal ends of the capillaries are coated with electrically conductive material, and which system also comprises a voltage source for moving fluid through the capillaries.

II: The method comprises passing fluid through the capillaries by means of a voltage potential between the distal and the proximal ends thereof, thereby depositing fluids in an array on a solid support surface.

Consequently, the search has been restricted to those parts of claims 23-36, 42-88, 90-94, 97-109 and 111-158 which relate to the subject matter referred to in (I) and (II) above.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International Application No

PCT/US 01/05695

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